

RESPONSE UNDER 37 C.F.R. § 1.116
U.S. Application No. 09/823,754
Attorney Docket No. Q61477

REMARKS

Reconsideration and allowance of this application are respectfully requested. Claims 1-12 are pending in the application. The rejections are respectfully submitted to be obviated in view of the remarks presented herein.

As a preliminary matter, Applicant respectfully submits that the finality status of the Office Action mailed August 10, 2005 is improper. All of the claims have been rejected under new combinations of references, and such rejections were not necessitated by amendment. Therefore, the Office Action of August 10, 2005 should be non-final. Applicant thus respectfully requests the Examiner to withdraw the finality of the Office Action in further prosecution of the instant application.

Rejection of Claims 1, 5 and 7

Claims 1, 5 and 7 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Applicant Admitted Prior Art in view of Teng et al. (U.S. Patent Number 5,285,280; hereinafter "Teng"). The rejection is respectfully traversed.

Regarding independent claim 1, the claimed invention relates to an apparatus for adjusting filter tap length of an adaptive equalizer. The apparatus includes a multipath detector and a tap length adjusting unit. The multipath detector detects multipath information from a difference between the correlation values of input data applied to the adaptive equalizer and a training sequence, and from an auto correlation value of a training sequence when the training sequence is valid. The tap length adjusting unit generates a tap length control signal based on

positions of the farthest pre-/post-ghosts by using the detected multipath information and a field sync signal.

Turning to the cited art, the Description of the Related Art section of the present application describes a data frame of a vestigial side band transmission system as shown in Figure 1a. Additionally, a data field sync segment is described as shown in Figure 1b. In an adaptive equalizer, the number of taps “is generally determined by the maximum range of ghosts to be canceled” (page 2, lines 16-18). Conventionally, 63 symbol sequences in which symbols of training sequences are alternately reversed have been used to detect and cancel ghosts (page 2, lines 18-20). This conventional detection and cancellation method suffers from a very limited range and a delayed ghost detection time due to the properties of the sequences (page 3, lines 3-15).

Examiner maintains that the combination of Applicant Admitted Prior Art and Teng teaches each feature of the claimed invention. However, Prior Art Figures 1a and 1b solely teach a structure of a data frame. Furthermore, the Description of the Related Art section only generally mentions that the number of taps of the adaptive equalizer is generally determined by the maximum range of ghosts to be canceled. Although this determination of the number of taps is determined by a **maximum range** of ghosts to be canceled, the determination as described in the Description of the Related Art section still only refers to a maximum range. The maximum range as described is a range of values only, which is different than “**positions of the farthest pre-/post-ghosts**” as claimed. The claimed invention generates a tap length control signal based on these specific positions, not merely an arbitrarily defined range. Although a range may be

specified in the Description of the Related Art, the specific positions of the farthest pre-/post-ghosts are not taught or suggested. Therefore, there is no teaching or suggestion in the Description of the Related Art section of an apparatus for adjusting a filter tap length for an adaptive equalizer **based on positions of the farthest pre-/post-ghosts by using detected multipath information** (wherein the multipath information is detected from a difference between the correlation values of input data applied to the adaptive equalizer and a training sequence, and from an auto correlation value of a training sequence when the training sequence is valid) and a field sync signal, as recited in the claim 1.

As previously mentioned, the claimed apparatus comprises “a multipath detector for detecting multipath information from a difference between the correlation values of input data applied to the adaptive equalizer and a training sequence, and from an auto correlation value of a training sequence when the training sequence is valid; and a tap length adjusting unit for generating a tap length control signal based on positions of the farthest pre-/post-ghosts by using the detected multipath information and a field sync signal. There is no teaching or suggestion in the Description of the Related Art section of any of these elements, as claimed. The Examiner also readily admits in paragraph 3 of page 2 of the Office Action that the Description of the Related Art section does not disclose implementing the correlation values so as to adaptively adjust the equalizer tap length.

Teng does not remedy the deficiencies of the Description of the Related Art section. Teng teaches the cancellation of ghosts in a received video signal by using a tap coefficient signal computed by dividing an auto-correlation of an ideal ghost cancellation reference (GCR)

signal by the cross-correlation of the ideal and received GCR signals (column 4, lines 29-40).

The tap coefficients are transferred to a FIR filter which filters the received video signal with these coefficients to cancel nearby ghosts (column 6, lines 49-52). Additionally, a prior art ghost canceling channel equalizer as shown in Figures 2(b) and 2(c) is also described. A received GCR signal is extracted from a received video signal and compared to an ideal GCR signal. Based on a discrepancy between the received and ideal GCR signals, tap coefficients are generated and used in a transversal filter for canceling ghosts (column 2, lines 12-32).

However, there is also no teaching in Teng of detecting multipath information from a difference between the correlation values of input data and a training sequence, and from an auto correlation value of a training sequence when the sequence is valid, as claimed. Teng also fails to disclose generation of a tap length control signal based on positions of the farthest pre-/post-ghosts by using the detected multipath information and a field sync signal. Teng calculates tap coefficients by dividing the auto-correlation of an ideal GCR by the cross-correlation of the ideal and received GCR signals. Alternatively, as described by figures 2(b) and 2(c), Teng calculates tap coefficients based on a discrepancy between received and ideal GCR signals, however, this difference is not found from between the specific correlation values as recited in the claims. Teng merely accepts as inputs to a digital signal process, an extracted received GCR signal and an ideal GCR signal, and computes a ghost tap coefficient signal by dividing auto-correlation of the ideal GCR signal by a cross-correlation of the ideal and received GCR signals in the digital signal processor. Thus, the coefficients in Teng are obtained solely from a division result of correlation values in Teng, and there is no detection of multipath information from a

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difference, as claimed. The mere presence of Teng's division does not teach or suggest the claimed detection of multipath information **from a difference**, because there is no indication or suggestion in Teng that any difference is obtained from a division operation. The division in Teng only results in a computation of a *quotient* value, not a difference of the values as claimed.

Furthermore, the comparison which is discussed in column 1, line 50 to column 2, line 68 and Fig. 2a-c of Teng does not teach or suggest any detection of multipath information from a difference because no difference is disclosed as the comparison result between "correlation values of input data applied to the adaptive equalizer and a training sequence, and from an auto correlation value of a training sequence when the training sequence is valid," as claimed. As recited in claim 1, the comparison result is further used to detect multipath information, which along with a field sync signal, is used to generate a tap length control signal based on positions of the farthest pre-/post-ghosts.

The combination of the Description of the Related Art section with Teng does not create a detection of multipath information as claimed, in which multipath information is detected "from a difference between the correlation values of input data applied to the adaptive equalizer and a training sequence, and from an auto correlation value of a training sequence when the training sequence is valid." Teng calculates tap coefficients based only on a division of an autocorrelation of an ideal GCR signal by a cross correlation of both the ideal GCR signal and a received GCR signal. The combination of Teng and the Description of the Related Art section would not have rendered the claimed invention obvious. Furthermore, the Examiner had

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previously admitted on pages 3-4 of the Office Action dated February 23, 2005 that the Description of the Related Art section in view of Teng fails to teach or suggest determining the coefficients by determining the difference of the auto-correlation and the cross-correlation.

The claimed invention adjusts a tap length **based on the detected multipath information from the specific relationship and functions**, as claimed. This distinction, and further the generation of the tap length control signal based on **positions** of the farthest pre-/post-ghosts by using the detected multipath information and a field sync signal, are not rendered obvious by the Description of the Related Art section in view of Teng. At least by virtue of the aforementioned differences, the invention defined by claim 1 is patentable over the Applicant Admitted Prior Art in view of Teng.

Regarding independent claim 5, this claim relates to a method for adjusting filter tap length of an adaptive equalizer corresponding basically to apparatus claim 1. The combination of the Description of the Related Art section and Teng fail to teach at least detecting multipath information from a difference between correlation values of input data applied to the adaptive equalizer and a reference signal, and from an auto correlation value of a training sequence. The deficiencies of the Description of the Related Art section and Teng are described above. At least by virtue of the aforementioned differences, the invention defined by claim 5 is also patentable over the Applicant Admitted Prior Art in view of Teng. Claim 7 is a dependent claim including all of the elements of independent claim 5, which, as established above, distinguishes over the Applicant Admitted Prior Art in view of Teng. Reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) are respectfully requested.

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Rejection of Claims 2, 6 and 8-12

Claims 2, 6 and 8-12 are rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the Applicant Admitted Prior Art in view of Teng et al. in further view of Whitaker (tvhandbook.com: ATSC DTV Receiver Systems; Chapter 17.2) in further view of “www.thefreedictionary.com.” The rejection is respectfully traversed.

The combination of the Description of the Related Art section and Teng do not teach every element of Applicant’s apparatus and method for adjusting filter tap length as recited in claims 1 and 5. Additionally, as admitted by Examiner in paragraph 4 of the Office Action, the Applicant Admitted Prior Art in view of Teng does not disclose a first and second multiplexer for enabling the input data and reference signal when the sync signal is “high.” Whitaker and “thefreedictionary.com” do not remedy these deficiencies.

Whitaker discloses data field sync detection by comparing each received data segment from an A/D converter with ideal field 1 and field 2 reference signals to obtain a symbol-by-symbol difference in a receiver as shown in Figure 17.2.6 (section 17.2.2e). An equalizer compensates for ghosts by using a least-mean-square (LMS) algorithm to compute adjustment of filter taps. A generated estimate of error is correlated with various delayed data signals, with the correlations corresponding to the adjustment needed to be made for each tap to reduce the error at the output (section 17.2.2g). Equalizer training signals consisting of pseudonoise sequences are major parts of the data field sync. The equalizer training signals are made up of 700 symbols (511+63+63+63), as shown in Figure 17.2.15 (section 17.2.2l). The Examiner has cited

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“thefreedictionary.com” solely to offer a definition of a multiplexer, such that “a two input multiplexer is a simple connection of logic gates whose output Y is either input A or input B depending on the value of a third input S which selects the input.”

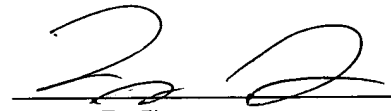
However, there is no teaching in either Whitaker or “thefreedictionary.com” of at least detecting multipath information from a difference between the correlation values of input data applied to the adaptive equalizer and a training sequence, and from an auto correlation value of a training sequence. There is no mention in Whitaker or “thefreedictionary.com” of using an auto correlation value of the training sequence in obtaining a difference for detecting multipath information. Additionally, the equalizer training signals of Whitaker are made up of 700 symbols. On the other hand, the claimed training sequence/reference signal is 704 symbols. At least by virtue of the aforementioned differences, the invention defined by claims 2 and 6 are patentable over the Applicant Admitted Prior Art in view of Teng in further view of Whitaker in further view of “thefreedictionary.com.” Reconsideration and withdrawal of the rejection under 35 U.S.C. § 103(a) are respectfully requested.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,



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